

Lincoln, Wis. 29th, Farmington, Me.; Monroe, Mass.; Manistee and Mottville, Mich.; Berlin Mills, N. H.; Jamestown, N. Y.; Florence, Wis. 30th, Ansley and Kennedy, Nebr.; Loa, Utah; Lusk, Wyo. 31st, Duluth, Minn.; Valentine, Nebr.; Chama, N. Mex.; Castlewood, Highmore, Hotch City, Millbank, and Wolsey, S. Dak.

## HAIL.

Description of the more severe hailstorms of the month is given under "Local storms." Hail was reported as follows: 1st, Indiana, Minnesota, Montana, and Wisconsin. 2d, Montana. 3d, Michigan, New York, and Ohio. 4th, Maryland, New York, North Carolina, and Pennsylvania. 5th, Maryland, Massachusetts, Ohio, and Pennsylvania. 8th, Alabama and California. 10th, Washington. 11th, California and Washington. 12th, Nebraska and Oregon. 13th, Missouri. 14th, California and Missouri. 15th, California. 16th,

California, Connecticut, Massachusetts, Nebraska, and New York. 17th and 18th, Kansas. 21st, Colorado. 22d, New Mexico. 23d, Michigan and New York. 25th, New York, North Carolina, and Ohio. 27th, California. 28th, Arizona, California, Michigan, and Rhode Island. 29th, Arizona, Massachusetts, New Hampshire, Ohio, and Pennsylvania. 30th, Kansas and Texas. 31st, Arkansas, Colorado, Idaho, Iowa, Missouri, and Texas.

## SLEET.

Sleet was reported as follows: 5th, New York, Ohio, and Pennsylvania. 6th, Vermont. 9th, Pennsylvania. 11th, California and Utah. 12th, New Mexico. 22d, Pennsylvania. 23d, Kansas. 24th, Arkansas and Michigan. 25th, Georgia, Michigan, North Carolina, and Pennsylvania. 26th, Pennsylvania. 29th, Michigan, Ohio, and Pennsylvania. 30th, Nebraska. 31st, Nebraska, Nevada, and Vermont.

## WINDS.

The prevailing winds for October, 1892, are shown on Chart II by arrows flying with the wind. In the New England and middle Atlantic states and the lower lake region the winds were generally from southwest to northwest; in the south Atlantic states, from north to northeast; over the Florida Peninsula, from northeast to east; in the Gulf States, from northeast to southeast; in the Ohio Valley and Tennessee, from northwest to northeast; in the upper lake region, the upper Mississippi valley, on the northeast slope of the Rocky Mountains, and along the middle Pacific coast, from south to northwest; in the extreme northwest, from west to north; in the Missouri Valley and on the southeast slope of the Rocky Mountains, from southeast to south; on the middle-eastern slope of the Rocky Mountains, over the middle plateau region, and along the north Pacific coast, from southeast to southwest; over the southern plateau region, from east to south; along the south Pacific coast, from west to northwest; and over the northern plateau region, variable.

## HIGH WINDS (in miles per hour).

Wind velocities of 50 miles, or more, per hour were reported at regular stations of the Weather Bureau as follows: 8th, 51, e., at Tatoosh Island, Wash. 9th, 64, se., at Fort Canby, Wash. 10th, 72, s., at Fort Canby, Wash. 12th, 72, sw., at Amarillo, Tex.; 64, nw., at Pueblo, Colo. 16th, 88, sw., at Pikes Peak, Colo.; 50, s., at Amarillo, Tex.; 50, se., at Huron, S. Dak.; 50, se., at Dodge City, Kans. 17th, 52, se., at Huron, S. Dak.; 50, s., at Saint Vincent, Minn. 22d, 50, ne., at New Orleans, La. 24th, 57, e., at Tatoosh Island, Wash. 25th, 62, e., at Tatoosh Island, Wash. 26th, 50, e., at Tatoosh Island, Wash. 27th, 60, e., at Tatoosh Island, Wash. 28th, 58, nw., at Chicago, Ill.; 56, sw., at Detroit, Mich.; 54, sw., at Cleveland, Ohio; 52, w., at Grand Haven, Mich.; 50, nw., at Milwaukee, Wis. 29th, 60, nw., at Cleveland, Ohio; 55, sw., at Detroit, Mich.; 50, nw., at Port Huron, Mich.

## LOCAL STORMS.

**1st.**—High wind unroofed dwellings and barns in eastern Maine. A heavy thunder and hail storm moved east over Saint Paul, Minn., in the afternoon; 2 buildings were struck by lightning. In Lavaca Bay, Tex., vessels were damaged by high wind.

**2d.**—At Marquette, Mich., a thunderstorm began in the early morning and ended 10.15 a. m.; a house was struck by lightning, and telephone wires were burned out.

**3d.**—In the evening a house in Cleveland, Ohio, was struck by lightning. A house and a barn near Mesquite, Tex., were struck by lightning.

**4th.**—A report from Eden Center, N. Y., states that 3 funnel-shaped clouds were observed over Lake Erie, and that one

of the clouds caused a waterspout which lasted about 30 minutes. The Weather Bureau station at Kittyhawk, N. C., was struck by lightning. In the evening a wind, rain, and hail storm moved northeast over Washington, N. C.; a church was struck by lightning.

**5th.**—A heavy thunder and rain storm occurred at Ventura, Cal., in the evening; the electric light plant was struck by lightning.

**7th.**—At Vevay, Ind., a house was struck by lightning. A northwest gale, with rain, prevailed at Marquette, Mich.; several vessels were obliged to seek shelter in the harbor.

**8th.**—At Solomons, Md., a thunderstorm prevailed from 5.50 to 7 p. m.; trees and outbuildings were blown down. In the evening a thunderstorm, with rain and a heavy squall of wind, caused minor damage at Mobile, Ala. The Milwaukee steamer from Grand Haven, Mich., was compelled to return to port on account of heavy seas and high wind on Lake Michigan. High southwest winds and heavy rain prevailed along the middle and north Pacific coasts.

**11-12th.**—At Cheyenne, Wyo., high northwest wind and snow began 10.25 p. m., 11th, and continued during the 12th; seven inches of snow fell; traffic on railroads was blocked; and telegraphic communication was cut off. At Pueblo, Colo., rain changed to snow at 10.30 a. m., 12th, and snow changed to rain in the afternoon, with high west to northwest winds which reached a velocity of 64 miles per hour at intervals between noon and 1 p. m. Considerable damage was caused by wind. Trains on lines running north were delayed by heavy snow. At Denver, Colo., rain alternated with snow in the morning, and the wind reached a velocity of 48 miles per hour from the northwest at 8 a. m., 12th. The storm was very severe throughout eastern Colorado; several persons and a large number of cattle were frozen. High wind and heavy rain caused considerable damage in Indian Territory. At Titusville, Fla., a heavy rainstorm occurred about noon, 12th; 2.60 inches of rainfall were recorded in 50 minutes.

**13th.**—At Kansas City, Mo., a thunder, rain, and hail storm began in the afternoon, and rain continued until midnight; a building was struck by lightning. At Eureka, Cal., rain fell from a cloudless sky from 10.30 to 11.30 p. m.; the raindrops were large and scattered; amount of rainfall, .02 inch.

**16th.**—A severe thunderstorm occurred in Connecticut and southern Massachusetts. At North Stonington, Conn., a man was reported killed by lightning. Near Bridgeport, Conn., lightning struck a barn, severely shocking one person and killing 2 horses. San Francisco, Cal., was visited by a heavy rain and thunder storm in the morning.

**22d.**—High wind delayed traffic and caused some damage to shipping about New York City and on Long Island Sound.

**23d.**—A report from Abilene, Tex., stated that the rainfall of the preceding five days, 5.66 inches, exceeded by 1.00 inch the greatest depth of rainfall recorded at that station for a like period in October; streams overflowed and roads were almost impassable.

**23d-25th.**—Northeast gales prevailed along the Carolina coasts.

**27th.**—At New Orleans, La., a church steeple was struck by lightning. At Wilgus, Ariz., a house was blown down.

**28th.**—An exceptionally heavy thunderstorm occurred in the mountains northeast of Pasadena, Cal.; some hail fell, and heavy rain swelled streams, causing some damage.

**28-29th.**—Heavy gales prevailed on the Great Lakes. About 40 vessels were wrecked or damaged, and much damage was caused in the interior. At Milwaukee, Wis., fire driven by high northwest wind destroyed property to the estimated value of \$5,000,000 on the 28th. At Marquette, Mich., the wind reached a velocity of 46 miles per hour from the north at 7.06 p. m. of the 28th, and continued to blow heavily until the morning of the 29th; the storm was reported the severest ever experienced at that station. A schooner was wrecked 9 miles south of Manistee, Mich. At Chicago, Ill., the wind shifted to northwest and reached a velocity of 58 miles per hour at 4 p. m., 28th, causing damage of a minor character.

At Red Wing, Minn., the wind reached a velocity of 48 miles per hour from the northeast at 9.23 a. m.; the storm was reported the severest of the season at that place. At Alpena, Mich., the gale began 5.20 p. m., 28th, and ended 1.45 p. m., 29th; vessels were detained, and a number of wrecks were reported. At Grand Haven, Mich., a southwest gale began the afternoon of the 28th; the wind shifted to west at 5 p. m., reached a velocity of 52 miles per hour at 11.07 p. m., and continued during the 29th; a schooner was wrecked near Muskegon, and the captain was drowned; and much damage of a minor character was caused in the city.

At Detroit, Mich., the gale began 8 a. m. of the 28th with a gust of wind reaching 45 to 60 miles per hour, and continued until 1.13 p. m. of the 29th. The storm was reported the most destructive in two years. The wind lowered the water in the river at Detroit 4 feet, and the water in Lake Saint Clair was lowered 2 feet. At Toledo the wind reached a velocity of 42 miles per hour at 2.17 a. m. of the 29th. At Sandusky, Ohio, a northwest gale during the 29th lowered the water in the bay 5 feet, grounding several vessels. At Cleveland, Ohio, the wind reached a velocity of 60 miles per hour from the northwest on the 29th; 3 steamers, 5 barges, and 2 schooners went ashore in the harbor. At Buffalo, N. Y., the wind reached a velocity of 42 miles per hour from the west at 12.54 a. m. of the 29th; vessels were delayed.

**29th.**—At Newburyport, Mass., a thunder, rain, and hail storm prevailed from 5 to 5.30 p. m., causing some damage.

## INLAND NAVIGATION.

### STAGE OF WATER IN RIVERS.

The following table shows the danger-points at the various river stations; the highest and lowest stages for the month, with the dates of occurrence, and the monthly ranges:

*Heights of rivers above low-water mark, Oct., 1892 (in feet and tenths).*

Stations.	Danger-point on gauge.	Highest water.		Lowest water.		Monthly range.
		Height.	Date.	Height.	Date.	
<i>Red River.</i>						
Shreveport, La. ....	29.9	7.3	31	1.9	13, 14	9.2
<i>Arkansas River.</i>						
Fort Smith, Ark. ....	22.0	10.2	24	0.7	14	9.5
Little Rock, Ark. ....	23.0	11.4	27	5.4	14	6.0
<i>Missouri River.</i>						
Fort Buford, N. Dak. ....	.....	5.4	26, 27	4.9	1	0.5
Bismarck, N. Dak. ....	.....	1.8	13	1.5	6, 27-29	0.3
Pierre, S. Dak. ....	14.0	0.7	16, 17	0.2	31	0.9
Sioux City, Iowa ....	18.7	7.0	19	4.5	31	2.5
Omaha, Nebr. ....	18.0	.....	.....	.....	.....	.....
Kansas City, Mo. ....	21.0	7.1	24	5.0	11, 12, 17	2.1
<i>Mississippi River.</i>						
Saint Paul, Minn. ....	14.0	3.1	2	2.2	29-31	0.9
La Crosse, Wis. ....	11.8	2.4	1	1.8	29, 31	0.6
Dubuque, Iowa. ....	16.0	3.4	1	2.7	16, 17	0.7
Davenport, Iowa. ....	15.0	2.4	1	1.6	14	0.8
Keokuk, Iowa. ....	14.0	2.3	2	1.3	15, 18-20, 22-27	1.0
Hannibal, Mo. ....	17.0	3.3	1, 2	2.2	21-27, 30	1.1
Saint Louis, Mo. ....	30.0	6.8	1, 2	5.0	18, 19, 24, 25	1.8
Cairo, Ill. ....	40.0	6.7	1, 4	3.9	27-30	2.8

### Heights of rivers—Continued.

Stations.	Danger-point on gauge.	Highest water.		Lowest water.		Monthly range.
		Height.	Date.	Height.	Date.	
<i>Mississippi River—Continued.</i>						
Memphis, Tenn.....	33.0	4.9	1	1.7	29-31	3.2
Vicksburg, Miss.....	41.0	5.2	1, 2	1.0	30	6.2
New Orleans, La.....	13.0	5.0	2	3.0	31	2.0
<i>Ohio River.</i>						
Parkersburg, W. Va.....	38.0	2.3	11	1.0	30, 31	1.3
Cincinnati, Ohio.....	45.0	6.0	1	3.6	29, 31	2.4
Louisville, Ky.....	24.0	3.8	2	2.4	29-31	1.4
<i>Cumberland River.</i>						
Nashville, Tenn.....	40.0	1.9	1, 3	0.1	27-31	2.0
<i>Tennessee River.</i>						
Chattanooga, Tenn.....	33.0	2.2	1	1.1	26-31	1.1
Knoxville, Tenn.....	29.0					
<i>Monongahela River.</i>						
Pittsburg, Pa.....	29.0	6.0	1	5.0	27	1.0
<i>Savannah River.</i>						
Augusta, Ga.....	32.0	7.3	2	5.9	17	1.4
<i>Willamette River.</i>						
Portland, Oregon.....	15.0	3.0	8	0.6	31	2.4
<i>Susquehanna River.</i>						
Harrisburg, Pa.....	17.0	1.4	3	0.5	31	0.9
<i>Alabama River.</i>						
Montgomery, Ala.....	48.0	2.3	1	0.7	27-31	1.6

The stage of water in the Ohio River and tributaries and in streams of the east Gulf states was very low throughout the month.

## ATMOSPHERIC ELECTRICITY.

### THUNDERSTORMS.

Description of the more severe thunderstorms reported for the month is given under "Local storms."

Thunderstorms were reported as follows: East of the Rocky Mountains they were reported in the greatest number of states, 16, on the 4th; in 10 to 15 on the 1st, 3d, 7th, 8th, 12th, 13th, 14th, and 17th; in 5 to 9 on the 2d, 5th, 10th, 11th,

16th, 18th, 19th, 20th, 29th, 30th, and 31st; and in 1 to 4 on the 6th, 9th, 15th, 21st, and 23d to 28th. The 22d was the only date on which thunderstorms were not reported.

East of the Rocky Mountains thunderstorms were reported on the greatest number of dates, 21, in Texas; on 12 in Florida; on 5 to 10 in Colorado, Illinois, Indiana, Iowa, Kansas, Louisiana, Michigan, Minnesota, Missouri, Nebraska, New York, Ohio, Oklahoma, Pennsylvania, South Dakota,